

## **AMENDMENTS TO THE CLAIMS**

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Previously Presented) An alkaline peroxide mechanical pulping process comprising the steps of:

feeding a lignocellulosic material into a first press;

pressing the lignocellulosic material;

discharging the lignocellulosic material from the first press;

impregnating the lignocellulosic material discharged from the first press with a first sodium hydroxide alkaline peroxide pretreatment solution and maintaining the impregnation for a first reaction time;

feeding the impregnated lignocellulosic material to a refiner having an inlet and a rotating disc within a superatmospheric casing;

refining the impregnated lignocellulosic material to form a primary pulp having a temperature of at least about 80C;

delivering a stream of primary pulp from the superatmospheric casing to a blow line while the primary pulp temperature is at least about 80C;

adding a sodium hydroxide alkaline peroxide blow line solution to the stream of primary pulp in the blow line while the primary pulp temperature is at least about 80C;

mixing the blow line solution and the stream of primary pulp to form a reaction mixture in the blow line;

discharging the reaction mixture having a temperature of at least about 80C into a retention vessel;

retaining the reaction mixture in the retention vessel to produce a bleached material.

2. (Previously Presented) The alkaline peroxide mechanical pulping process of claim 1 further comprising;

feeding the lignocellulosic material that has been impregnated with the first

pretreatment solution for a first reaction time, into a second press;

pressing and discharging the lignocellulosic material from the second press;

impregnating the lignocellulosic material discharged from the second press with a second sodium hydroxide alkaline peroxide pretreatment solution and maintaining the second impregnation for a second reaction time.

3. (Previously Presented) The alkaline peroxide mechanical pulping process of claim 1 further comprising adding a sodium hydroxide alkaline peroxide refiner solution to the lignocellulosic material at the refiner.

4. (Original) The alkaline peroxide mechanical pulping process of claim 1, wherein the step of feeding the impregnated lignocellulosic material to a refiner having an inlet and a rotating disc within a superatmospheric casing includes maintaining the superatmospheric casing at a pressure of at least about 240kPa.

5. (Original) The alkaline peroxide mechanical pulping process of claim 1, wherein the step of mixing is immediately followed by introducing the mixture into a separator and the separated pulp is then discharged into said retention vessel.

6. (Previously Presented) The alkaline peroxide mechanical pulping process of claim 1, wherein the step of adding an alkaline peroxide blow line solution to the stream of primary pulp includes adding the blow line solution immediately after the blow valve.

7. (Previously Presented) The alkaline peroxide mechanical pulping process of claim 5, wherein the step of adding an alkaline peroxide blow line solution to the stream of primary pulp includes adding the blow line solution immediately prior to the separator.

8. (Previously Presented) The alkaline peroxide mechanical pulping process of claim 1, wherein the step of delivering a stream of primary pulp from the

superatmospheric casing to the blow line further includes the primary pulp having a temperature in the range of about 90C to about 155C and a consistency of about 20 to about 60%.

9. (Original) The alkaline peroxide mechanical pulping process of claim 1, wherein the reaction mixture is retained in the retention vessel at a temperature of about 60C to about 95C and a consistency of about 20% to about 40%.

10. (Original) The alkaline peroxide mechanical pulping process of claim 1, wherein the reaction mixture is retained in the retention vessel at a temperature of about 85C to about 95C, and a consistency of about 30%.

11. (Previously Presented) The alkaline peroxide mechanical pulping process of claim 1, wherein the impregnation solution contains sodium hydroxide, peroxide, and stabilizer; the blow line solution contains sodium hydroxide, peroxide, and stabilizer; and said blow line solution has a temperature less than about 80C.

12. (Previously Presented) The alkaline peroxide mechanical pulping process of claim 2, wherein the first impregnation solution contains 0.3% DTPA; the second impregnation solution contains by weight per cent 0.2% MgSO<sub>4</sub>, 4.4% silicate, 2.8% TA, and 2.8% H<sub>2</sub>O<sub>2</sub>; and the blow line solution contains by weight per cent 0.16% DTPA, 0.16% MgSO<sub>4</sub>, 2.3% silicate, 1.8% TA with 0.5% being residual, 2.4% H<sub>2</sub>O<sub>2</sub> with 1.1% being residual.

13. (Previously Presented) The alkaline peroxide mechanical pulping process of claim 2, wherein the first impregnation solution contains by weight per cent 0.5% DTPA; the second impregnation solution contains by weight per cent 0.2% DTPA, 0.1% MgSO<sub>4</sub>, 2.0% silicate, 1.6% TA, and 2.6% H<sub>2</sub>O<sub>2</sub>; and the blow line solution contains by weight per cent 0.13% DTPA, 0.13% MgSO<sub>4</sub>, 2.5% silicate, 1.2% TA with 0.1% being residual, 2.1% H<sub>2</sub>O<sub>2</sub> with 2.1% being residual.

14. (Previously Presented) The alkaline peroxide mechanical pulping process of claim 2, wherein the first impregnation solution contains by weight per cent 0.3% DTPA, 0.05% MgSO<sub>4</sub>, 0.7% silicate, 0.2% TA, and 0.5% H<sub>2</sub>O<sub>2</sub>; the second impregnation solution contains by weight per cent 0.1% DTPA, 0.08% MgSO<sub>4</sub>, 1.8% silicate, 1.4% TA, and 1.9% H<sub>2</sub>O<sub>2</sub>; and the blow line solution contains by weight per cent 0.22% DTPA, 0.11% MgSO<sub>4</sub>, 1.1% silicate, 0.9% TA with 0.2% being residual, 1.2% H<sub>2</sub>O<sub>2</sub> with 1.7% being residual.

15. (Previously Presented) The alkaline peroxide mechanical pulping process of claim 2, wherein the first impregnation solution contains by weight per cent 0.4% TA, 0.5% H<sub>2</sub>O<sub>2</sub>, 0.2% DTPA, 0.04% MgSO<sub>4</sub>, 0.5% silicate; the second impregnation solution contains by weight per cent 0.14% DTPA, 0.05% MgSO<sub>4</sub>, 0.5% silicate, 0.4% TA, and 0.6% H<sub>2</sub>O<sub>2</sub>; and the blow line solution contains by weight per cent 0.18% DTPA, 0.06% MgSO<sub>4</sub>, 1.8% silicate, 1.2% TA with 0.1% being residual, 1.8% H<sub>2</sub>O<sub>2</sub> with 1.1% being residual.

16. (Previously Presented) The alkaline peroxide mechanical pulping process of claim 2, wherein the first impregnation solution contains by weight per cent 0.4% TA, 0.6% H<sub>2</sub>O<sub>2</sub>, 0.18% DTPA, 0.03% MgSO<sub>4</sub>, 0.3% silicate; the second impregnation solution contains by weight per cent 0.15% DTPA, 0.05% MgSO<sub>4</sub>, 0.4% silicate, 0.4% TA, and 0.7% H<sub>2</sub>O<sub>2</sub>; and the blow line solution contains by weight per cent 1.7% TA, and 2.8% H<sub>2</sub>O<sub>2</sub> with 1.1% being residual.

17. (Cancelled)

18. (Previously Presented) An alkaline peroxide mechanical pulping process comprising the steps of:

in a primary refiner having a superatmospheric casing, refining a lignocellulosic material that has been pretreated and impregnated with at least a first sodium hydroxide alkaline peroxide pretreatment solution;

discharging the lignocellulosic material at temperature of at least about 80°C into

a blow line having at least one solution inlet port;

injecting a sodium hydroxide alkaline peroxide blow line solution through the at least one solution inlet port;

mixing the blow line solution and the lignocellulosic material in the blow line;

discharging the lignocellulosic material from the blow line at a temperature of at least about 80C; and

maintaining the discharged lignocellulosic material for a reaction period.

19. (Previously Presented) The alkaline peroxide mechanical pulping process of claim 18, wherein the step of refining further includes adding a refiner solution of sodium hydroxide alkaline peroxide at the primary refiner.

20. (Currently Amended) The alkaline peroxide mechanical pulping process of claim 18, wherein the step of injecting an alkaline peroxide blow line solution through the at least one solution inlet port and into the blow line containing the lignocellulosic material includes injecting an alkaline peroxide intermediate line solution through, at least, one solution inlet port located ~~from immediately after to within three feet after~~ the blow valve.

21. (Currently Amended) An alkaline peroxide mechanical pulping process comprising the steps of:

feeding a lignocellulosic material into a first press;

pressing the lignocellulosic material;

discharging the lignocellulosic material from the first press;

impregnating the lignocellulosic material discharged from the first press with a first sodium hydroxide alkaline peroxide pretreatment solution and maintaining the impregnation for a first reaction time;

feeding the impregnated lignocellulosic material to a refiner having an inlet and a rotating disc within a superatmospheric casing;

refining the impregnated lignocellulosic material to form a primary pulp;

discharging the stream of primary pulp from the superatmospheric casing to a blow line;

adding a sodium hydroxide alkaline peroxide blow line solution to the stream of primary pulp ~~at or within about three feet~~ immediately after the blow valve;

mixing the blow line solution and the stream of primary pulp to form a reaction mixture;

discharging the reaction mixture into a retention vessel;

retaining the reaction mixture in the retention vessel to produce a bleached material.

22. (Previously Presented) The alkaline peroxide mechanical pulping process of claim 21, further comprising;

feeding the lignocellulosic material that has been impregnated with the first pretreatment solution for a first reaction time, into a second press;

pressing and discharging the lignocellulosic material from the second press;

impregnating the lignocellulosic material discharged from the second press with a second sodium hydroxide alkaline peroxide pretreatment solution and maintaining the second impregnation for a second reaction time.

23. (Previously Presented) The alkaline peroxide mechanical pulping process of claim 21 further comprising adding a sodium hydroxide alkaline peroxide refiner solution to the lignocellulosic material at the refiner.

24. (Cancelled)

25. (Cancelled)

26. (Cancelled)

27. (Cancelled)

28. (Original) The alkaline peroxide mechanical pulping process of claim 21, wherein the step of feeding the impregnated lignocellulosic material to a refiner having an inlet and a rotating disc within a superatmospheric casing includes maintaining the superatmospheric casing at a pressure of at least about 240kPa.

29. (Previously Presented) The alkaline peroxide mechanical pulping process of claim 21, wherein the impregnation solution contains sodium hydroxide, peroxide, and stabilizer; the blow line solution contains sodium hydroxide, peroxide and stabilizer; and said blow line solution is at a temperature less than the stream of primary pulp.

30. (Previously Presented) The alkaline peroxide mechanical pulping process of claim 22, wherein the first impregnation solution contains by weight per cent 0.3% DTPA; the second impregnation solution contains by weight per cent 0.2% MgSO<sub>4</sub>, 4.4% silicate, 2.8% TA, and 2.8%H<sub>2</sub>O<sub>2</sub>; and the blow line solution contains by weight per cent 0.16% DTPA, 0.16% MgSO<sub>4</sub>, 2.3% silicate, 1.8% TA with 0.5% being residual, 2.4% H<sub>2</sub>O<sub>2</sub> with 1.1% being residual.

31. (Previously Presented) The alkaline peroxide mechanical pulping process of claim 22, wherein the first impregnation solution contains by weight per cent 0.5% DTPA; the second impregnation solution contains by weight per cent 0.2% DTPA, 0.1% MgSO<sub>4</sub>, 2.0% silicate, 1.6% TA, and 2.6%H<sub>2</sub>O<sub>2</sub>; and the blow line solution contains by weight per cent 0.13% DTPA, 0.13% MgSO<sub>4</sub>, 2.5% silicate, 1.2% TA with 0.1% being residual, 2.1% H<sub>2</sub>O<sub>2</sub> with 2.1% being residual.

32. (Previously Presented) The alkaline peroxide mechanical pulping process of claim 22, wherein the first impregnation solution contains by weight per cent 0.3% DTPA, 0.05% MgSO<sub>4</sub>, 0.7% silicate, 0.2% TA, and 0.5%H<sub>2</sub>O<sub>2</sub>; the second impregnation solution contains by weight per cent 0.1% DTPA, 0.08% MgSO<sub>4</sub>, 1.8% silicate, 1.4% TA, and 1.9%H<sub>2</sub>O<sub>2</sub>; and the blow line solution contains by weight per cent 0.22% DTPA, 0.11% MgSO<sub>4</sub>, 1.1% silicate, 0.9% TA with 0.2% being residual, 1.2% H<sub>2</sub>O<sub>2</sub> with 1.7% being residual.

33. (Previously Presented) The alkaline peroxide mechanical pulping process of claim 22, wherein the first impregnation solution contains by weight per cent 0.4% TA, 0.5% H<sub>2</sub>O<sub>2</sub>, 0.2% DTPA, 0.04% MgSO<sub>4</sub>, 0.5% silicate; the second impregnation solution contains by weight per cent 0.14% DTPA, 0.05% MgSO<sub>4</sub>, 0.5% silicate, 0.4% TA, and 0.6% H<sub>2</sub>O<sub>2</sub>; and the blow line solution contains by weight per cent 0.18% DTPA, 0.06% MgSO<sub>4</sub>, 1.8% silicate, 1.2% TA with 0.1% being residual, 1.8% H<sub>2</sub>O<sub>2</sub> with 1.1% being residual.

34. (Previously Presented) The alkaline peroxide mechanical pulping process of claim 22, wherein the first impregnation solution contains by weight per cent 0.4% TA, 0.6% H<sub>2</sub>O<sub>2</sub>, 0.18% DTPA, 0.03% MgSO<sub>4</sub>, 0.3% silicate; the second impregnation solution contains by weight per cent 0.15% DTPA, 0.05% MgSO<sub>4</sub>, 0.4% silicate, 0.4% TA, and 0.7% H<sub>2</sub>O<sub>2</sub>; and the blow line solution contains by weight per cent 1.7% TA, and 2.8% H<sub>2</sub>O<sub>2</sub> with 1.1% being residual.

35. (Cancelled)

36. (Previously Presented) An alkaline peroxide mechanical pulping process comprising the steps of:

in a primary refiner having a superatmospheric casing, refining a lignocellulosic material that has been pretreated and impregnated with at least a first sodium hydroxide alkaline peroxide pretreatment solution into a primary pulp having a temperature in the range of about 90C to about 155C and a consistency of about 20 to about 60%;

discharging the lignocellulosic material through a blow valve into an intermediate line in fluid communication with at least a first further pulp processing apparatus for separating, cleaning, pressing, bleaching, or refining the primary pulp and having at least one solution inlet port upstream of said further apparatus;

injecting sodium hydroxide alkaline peroxide intermediate line solution through the at least one solution inlet port at a temperature below about 80C;

mixing the intermediate line solution and the lignocellulosic material in the



intermediate line upstream of said further apparatus;

discharging the lignocellulosic material from the intermediate line; and

retaining the discharged lignocellulosic material for a reaction period.

37. (Previously Presented) The alkaline peroxide mechanical pulping process of claim 36, wherein the step of refining further includes adding a refiner sodium hydroxide solution of alkaline peroxide at the primary refiner.

38. (Currently Amended) The alkaline peroxide mechanical pulping process of claim 36, wherein the step of injecting an alkaline peroxide intermediate line solution through the, at least one, solution inlet port and into the intermediate line containing the lignocellulosic material includes injecting an alkaline peroxide intermediate line solution through, at least, one solution inlet port located immediately after ~~[[a]]~~ said blow valve.

39. (Cancelled)

40. (Cancelled)

41. (Cancelled)

42. (Previously Presented) An alkaline peroxide mechanical pulping process comprises the steps of:

in a refiner having a casing, additionally refining a lignocellulosic based material that has been previously pretreated and impregnated with at least a first sodium hydroxide alkaline peroxide pretreatment solution and which has been previously refined;

discharging the lignocellulosic based material through a blow valve into an intermediate line in fluid communication with at least a first further pulp processing apparatus for separating, cleaning, pressing, bleaching, or refining the primary pulp and having at least one solution inlet port upstream of said further apparatus;

injecting a sodium hydroxide alkaline peroxide intermediate line solution through

the at least one solution port;

mixing the intermediate line solution and the lignocellulosic based material in the intermediate line upstream of said further apparatus;

discharging the lignocellulosic based material from the intermediate line; and

retaining the discharged lignocellulosic based material for a reaction period.

43. (Original) The alkaline peroxide mechanical pulping process of claim 42, wherein the refiner casing is superatmospheric.

44. (Previously Presented) The alkaline peroxide mechanical pulping process of claim 1, wherein more than one third of the total sodium hydroxide alkaline peroxide solution added from impregnation to the blow line inclusive, is added at the blow line.

45. (Previously Presented) The alkaline peroxide mechanical pulping process of claim 3, wherein more than one third of the total sodium hydroxide alkaline peroxide solution added from impregnation to the blow line inclusive, is added at the blow line.

46. (Previously Presented) The alkaline peroxide mechanical pulping process of claim 21, wherein more than one third of the total sodium hydroxide alkaline peroxide solution added from impregnation to the blow line inclusive, is added at the blow line.

47. (Previously Presented) The alkaline peroxide mechanical pulping process of claim 23, wherein more than one third of the total sodium hydroxide alkaline peroxide solution added from impregnation to the blow line inclusive, is added at the blow line.

48. (Previously Presented) The alkaline peroxide mechanical pulping process of claim 36, wherein more than one third of the total sodium hydroxide alkaline peroxide solution added from impregnation to the blow line inclusive, is added at the blow line.

49. (Previously Presented) The alkaline peroxide mechanical pulping process of claim 37, wherein more than one third of the total sodium hydroxide alkaline peroxide

solution added from impregnation to the blow line inclusive, is added at the blow line.

50. (New) The alkaline peroxide mechanical pulping process of claim 5, wherein

the stream of primary pulp from the casing to the blow line includes steam and the pulp has a temperature in the range of about 90C to about 155C and a consistency of about 20% to about 60%;

the pulp in the reaction mixture is separated from the steam; and

the separated pulp is discharged directly from the separator into and retained in the retention vessel at a temperature of about 60C to about 95C and a consistency of about 20% to about 40%.

51. (New) The alkaline peroxide mechanical pulping process of claim 50, wherein more than one third of the total sodium hydroxide alkaline peroxide solution added from impregnation to the blow line inclusive, is added at the blow line.

52. (New) The alkaline peroxide mechanical pulping process of claim 51, comprising,

feeding the lignocellulosic material that has been impregnated with the first pretreatment solution for a first reaction time, into a second press;

pressing and discharging the lignocellulosic material from the second press;

impregnating the lignocellulosic material discharged from the second press with a second sodium hydroxide alkaline peroxide pretreatment solution and maintaining the second impregnation for a second reaction time; and

adding a sodium hydroxide alkaline peroxide refiner solution to the lignocellulosic material at the refiner.